Language translation method involving open all-information template man-machine dialogue and all-information semanteme marking system

Field of the Invention

The present invention relates to a machine translation method, and more particularly, to a machine translation method adapted to communicate information in various natural languages among terminals on the computer network.

Background of the Invention

With the advantage of its wide reaches, the computer network technology has rapidly created an era of global network communication. However, the obstacles in communicating semantic information among various natural languages have significantly restricted the efficiency of the use of network and network information. How to enable a terminal user to communicate semantic information over the network only using his own natural language by means of machine translation is undoubtedly of great practical significance and high commercial value for saving the network space, improving the efficiency of transmitting the network information, and realizing the universal sharing of the network information resources.

In the field of machine translation nowadays, on the one hand, the machine translation methods described in the text books of artificial intelligence have rarely been used in practical development of products, on the other hand, the machine translation methods employed in the developed machine translation systems can not achieve the anticipated target. Above facts show that: the study of the basic theory in machine translation is very backward; the machine translation methods presently used have common drawbacks; and the anticipated target is not practical itself. In 1990s, two kinds of new machine translation methods arose and gradually became the mainstream of natural language information processing technology. One method is intended to establish a language material library mainly based on the statistical analysis of a vast amount of real texts, the other method uses man-machine dialogue and restriction on natural languages.

Statistical analysis of a vast amount of real texts is to sample and analyze a vast amount of real texts in terms of symbol, sentence pattern, grammar attributes, and semanteme, so as to provide a variety of matching modes for a symbol strings in one natural languages. Therefore, it is an experience-based language information processing method. In the view of methodology, such language information processing method can process a variety of results of matching analysis of the source language synthetically and establish a matching relationship with a variety of results of matching analysis of the object language so as to implement the automatic translation of natural language. In practice, however, because of the random and open characteristics of the natural languages, all the statistical methods can only provide probabilistic knowledge,

but can not restrict the creation of a new definition of a word in a natural languages, determine the exact contents of various omissions, and clear up the ambiguity which may arise when the object language translation is created. Therefore, although statistical analysis of a vast amount of real texts is an important fundamental work for computer processing of various natural language information, this technology needs to be incorporated into an effective object processing system before it can realize its value.

The machine translation method using man-machine dialogue and restriction on natural language is to adjust the machine translation dictionary and the expression of the source language and adjust the translation result meanwhile at the input end by the user. Despite of its fairly good translation quality, this method requires the users to master both of the source and the object languages skillfully and needs very high cost of learning of man-machine dialogue and high cost of operation which is comparable to that of manual translation.

Object of the Invention

The object of the present invention is to provide a language translation method involving open all-information template man-machine dialogue so as to clear away the obstacles in communicating information among various languages over the computer network and to effect a substantial breakthrough of the machine translation technology. The breakthrough must meet the following requirements:

1. Effectively restricting use of new words of natural languages and use of new meaning of a word;

2. Analyzing a semanteme independently of the context;

3. Accurately communicating the semantic information through literary translation;

4. Finding out a way to clear up the ambiguity which may arise when the object language translation is created;

5. The user only needs to master his native language skillfully;

6. Taking advantage of the method of statistical analysis of a vast amount of real text and fully implementing man-machine complementation;

7. Meeting the needs for converting a souce language into various object languages.

Another object of the present invention is to provide an all-information semanteme marking system, with which all the semantic information of a text can be marked and the marking information is stored with the text. The marking information can be retrieved out together with the text.

Summary of the Invention

According to one aspect of the present invention, a language translation method involving open all-information template man-machine dialogue is provided which includes the following steps:

a. commonly restricting various natural languages;

b. establishing a man-machine dialogue template for one sentence which includes all the necessary semantic information elements of various natural languages;

c. providing by the man-machine dialogue template all the commonly restricted candidate semantic information items corresponding to the original language symbols and blank information items for expanding by the user;

d. automatically optimizing among all the commonly restricted candidate semantic information items by the computer of the translation system, and then manually readjusting and confirming the optimized results on the man-machine dialogue template by the user of the original text; and

e. creating the translation based on the semantic information items determined through man-machine complementation and converting the semantic information items determined through man-machine complementation into translation symbols which are provided together with the translation to the user of the object language.

According to another aspect of the present invention, an all-information semanteme marking system is provided which includes:

necessary semantic information library for storing therein basic vocabulary and definition of concepts thereof and syntax information items;

text input means for inputting a text the semanteme of which is to be marked;

text storage means for storing the text inputted through the text input means;

text display means for displaying a text stored in the text storage means;

sentence selecting means for selecting a sentence in the text displayed by the text display means;

automatic sentence structure analyzing means for automatically analyzing the structure of the selected sentence based on statistical experience;

semanteme marking template display means for displaying a semanteme marking template, wherein: when a sentence is selected by the sentence selecting means, the semanteme marking template is displayed corresponding to the selected sentence, said template includes vocabulary information element items and syntax information element items corresponding to the words in the sentence, wherein the definition of concepts and all the synonyms of the words included in the necessary semantic information library are displayed in the corresponding vocabulary information element items, while all the possible syntax information items of the words are displayed in the syntax information element items based on the analysis results of the automatic sentence structure analyzing means, where the syntax information items are also retrieved from the necessary semantic information library;

semanteme marking means adapted for the user to select, for each word, one item from the definition of concepts and the synonyms in the vocabulary information element items and one item from the syntax information items in the syntax information element items;

marked text storage means for storing the text with the marking information;

marking instructing means for instructing the system to display the marking information of a sentence in the text displayed by the text display means; and

marking display means for displaying in the form of said marking template the marking information corresponding to the instructed sentence which is stored in the marked text storage means.

Industrial Applicability

The language translation method involving open all-information template man-machine dialogue of the invention has the following technical features: the user directly selects among the template information during the man-machine dialogue; the user only needs to master his native language; the method is proposed in full consideration of the practical information processing capability of the computer and with the central task and the practical target being accurately communicating semantic information; the method makes full use of man-machine complementation and the translation is independent of the context and the field of application; the method provides a scheme for totally clearing away the main technical obstacles of machine translation through establishing an unified restriction criterions and an selective all-information and whole-course

man-machine dialogue and provides a technical solution for radically improving the quality of machine translation; the method makes full use of the large scale language material library which has already been established, processes the natural languages concisely and has good feasibility; although the man-machine dialogue is impossible for a language which the user does not understand during the stage of solving the original information, translation results of various languages can be obtained for one sauce language while the translation quality is maintained.

The language translation method involving open all-information template man-machine dialogue of the invention is of great practical value in the field of network information communication and has broad international market in network on-line machine translation service.

The semanteme marking system of the invention can store the annotations of the vocabulary and grammar structure of a text together with the text and display the marking information when necessary. The system may be widely used in language teaching, annotating of legal documents, and so on.

Brief Description of the Drawings

Figure 1 illustrates the structure of natural language all-information dialogue template for a sentence;

Figure 2 illustrates the contents of an all-information dialogue template for an English sentence;

Figure 3 illustrates the common restriction of vocabulary information among various natural languages;

Figure 4a and 4b illustrate two kinds of dialogue information displaying methods during man-machine dialogue, respectively;

Figure 5 illustrates the spatial positioning structure of the information about the part of speech;

Figure 6 illustrates the man-machine interactive information processing when translating an English sentence according to the method of the invention; and

Figure 7 illustrates the inquiry of the user of the translation about the syntax information item which is actually carried by the natural language symbol "with a telescope" .

Best Mode to Carry out the Invention

The principle of the language translation method involving open all-information template man-machine dialogue of the invention will now be explained in conjunction with an example of translating an English sentence into Chinese. The exemplary sentence is "I saw a boy with a telescope near the bank" .

The above exemplary sentence includes many language symbols, herein a language symbol may be a word or a phrase. Each language symbol carries some semantic information, which belong to a variety of types such as definition

of concepts, tense, voice, part of speech, etc. For example, the definition of concept of the word "saw" is "to use the eyes to look at", its tense is past tense, its voice is active voice, and its part of speech is predicate. Because of the complexity and diversity of the natural languages, however, it is possible for a language symbol to carry more than one semantic information of the same type. For example, in addition to the definition of "to use eyes to look at", the concept of the word "saw" may also be defined as "to understand or recognize". For another example, the part of speech of the phrase "with a telescope" may be either modifier of the predicate or the modifier of the object.

It is the view of the inventor that the fundamental task of natural language translation is to accurately communicate the semantic information actually carried by the original language symbols to the users of different languages. To achieving this object, this invention adopts the following measures: determining all the semantic information items of a sentence of the original language through man-machine dialogue on side of the user of the original text, creating the translation of the sentence based on the determination, converting the determination itself into translation symbols and providing the translation symbols together with the translation of the sentence to the user of the object language for his reference if the translation of the sentence is doubtful. In this manner, a whole-course translation participated in by both the user of the original language and the user of the object language and the quality of communicating the semantic information is greatly improved.

In order to determine a semantic information of the original language, a natural language all-information dialogue template for a sentence is established as shown in Figure 1. So called "all-information" means that the template

contains therein all the necessary semantic information elements of various language systems, including items of definition of concepts, items of tense and items of voice which belong to vocabulary information elements and items of part of speech which belongs to the syntax information element. The template is used to provide the user of the original text with the candidate semantic information items corresponding to the original language symbols for man-machine interactive selection. The contents of the dialogue information items, as will be explained hereinafter, must be restricted by the system. The template also contains some selective information items which do not require user's selection necessarily, such as semantic attributes, grammar attributes, case (upper position), and so on. These information items may be determined by the computer without the user's selection, so as to provide relevant information for automatically converting into the object language.

In order to accurately communicate the semantic information among various languages, it would be best to adopt literal translation because the machine translation system can not adjust the vocabulary and the pattern of the sentence of object language randomly. Because of the differences among the concept system and syntax system of various languages, however, it must be ensured that the vocabulary information items and the syntax information items can be equivalently exchanged between the source language and the object language so as to ensure the quality of the literal translation. Therefore, in present invention, the differences among various languages are handled through establishing a common restriction principle. Such common restriction principle includes common restriction of syntax information and common restriction of vocabulary information.

The common restriction principle of syntax information includes: unifying those syntax information having the same function but different objects; deleting as many as possible those syntax concepts which are not indispensable in the analysis of the semanteme assembling relationship, such as the direct object and the indirect object in English grammar. Only the simplified and commonly restricted syntax information concepts are provided in the template as standard syntax information items of various languages for selecting by the user.

As shown in Figure 3, the common restriction principle of vocabulary information is to determine a basic concept set through statistically analyzing the use frequency of words in main languages and merging the synonyms. In practical operation, however, the basic concepts in various languages are not completely correspondent. If a concept has no correspondent in a language, the concept should be illustratively described using other ordinary words in the language, so that the basic concepts in various languages are compulsorily aligned. For example, the verb sense of the English word "orphan" is determined as a basic concept, while there is no correspondent in Chinese. In such case, the concept should be illustratively described using Chinese phrase "使成为孤儿" (means "cause to be an orphan"). In addition, the near synonyms of the basic concepts in various languages are taken as the attached near words. Since it is impossible that all the near synonyms of the basic concepts in one natural language have correspondents in other languages, in case no corresponding near synonym can be found in one language, it should be substituted using basic concepts in the language (such substitution is also inevitable in manual translation). Those information which still can not be handled after having undergone above two common restrictions are determined as redundant information for which blank information items are provided in the

template. When determining the definition of concepts of the words of various natural languages, the invention adopts vague common restriction centering about connotation (e.g. Chinese word "学校" and English word "school"), concept unified common restriction regardless of the differences of the grammar attributes (e.g. regardless of all the tense variations of the English word "become") and probabilistic common restriction which gives a priority to the concepts used in a variety of languages. To enhance its ability of expression, any language needs some near synonyms of the same concept. Therefore, the use probability of a word is taken as the criterion of redundancy of a concept of a word. The priority is given to those words which are used in a variety of languages, and then to those words which have high use probability in one language. Other words which do not meet above two requirements are handled as redundant concepts, correspondingly, blank information items are provided in the all-information dialogue template. Only the definitions of concepts which have undergone the common restriction are provided as the candidate vocabulary information items in the all-information dialogue template to the users of various languages for their selection, so as to ensure the equivalent exchangeability among the vocabulary concept information of various natural languages. The invention also sets unified codes for corresponding vocabulary concepts in various languages for the convenience of communicating over the network.

On the other hand, in order to handle the natural language symbols which are not included in the system to make the man-machine interaction more flexible, the dialogue template of the invention is designed as an open template under the basic principle of the common restriction. That is, when an original natural language symbol is not included in the machine translation system, the user of the original text may describe it using the natural language symbols

which have been included in the system and the information items of which has been determined.

The method of commonly restricting various natural language systems compulsorily of the invention differs from the conventional method of intermediate language. The conventional method of intermediate language is oriented to the natural language systems which are not restricted at all and implements mutual translation through establishing an intermediate concept system among various natural languages. However, because of the openness of various natural language concept systems, it is impossible for the intermediate concept system to have distribution. The method of compulsory common restriction is to impose necessary common restriction on the vocabulary and the senses thereof through man-machine dialogue and impose reasonable restrictions on the differences among and the openness of various natural language systems, to ensure the equivalent exchangeability among vocabulary concepts and syntax concepts of various natural languages.

Now referring to Figure 2, the method of determining the semantic information of the original language by the user of the original language will be explained. The commonly restricted candidate semantic information items corresponding to the original language symbols provided by the man-machine dialogue template to the user is shown. The process of determining the semantic information of the original is to select among, to confirm, and to supplement the candidate information items in the man-machine dialogue template.

The selecting of vocabulary information items should make full use of man-machine complementation. Automatic computer optimization should follow the following basic principles: arranging the vocabulary information

items of a polysemous word in a sequence of use frequency through statistical analysis of a vast amount of real text to reduce the searching scope of the information items; optimizing the vocabulary information items based on the correlation between the syntax information items and the vocabulary information items through statistical analysis of a vast amount of real text to further reduce the selecting scope of information items (For example, for the words which may act as subject, the noun sense thereof is given a priority, such as "I" and "telescope" in Figure 2); obtaining the probabilistic information on word combinations through statistical analysis of a vast amount of real text to further optimize the vocabulary information items (For example, in Chinese phrase of "好漂亮的一朵花", "好" is a polysemous word, and the most probable sense of "好" in front of the adjective "漂亮" is adverb "非常" (very); for language symbols which clearly express the grammar attribute information, deriving from the grammar attribute the vocabulary information items to be selected (For example, although "spring" is a polysemous word in English, the past tense of its verb sense, "sprang", limits the selecting scope of sense clearly).

Most of the vocabulary information items which the user actually need can be given the first rank through above automatic selection. Since the user has already had an idea about the vocabulary information items to express the semanteme, the selecting of most of the vocabulary information items is simply to confirm the preferred information items in the template.

In various natural languages, the syntax information, either clearly expressed or obscurely expressed, includes the information about the grammar attribute, the information about the part of speech, and the information about the

case (upper position), wherein the information about the part of speech is the only syntax organization system having complete organizing ability and generality. Therefore, as long as the information items about the part of speech is determined, the semanteme assembling relationship of a natural language symbol string can be determined. The selecting of syntax information items should also make full use of man-machine complementation, and the basic principles are as follows: obtaining the matching relationship between the information about the sequence, the grammar attribute and the case (upper position) and the syntax information through statistical analysis of a vast amount of real text to automatically optimizing the syntax information items. If its sequence is first, its grammar attribute is noun, and its case is the subject of the behavior, a word can be determined as the subject. The information items about the part of speech is ultimately determined by the user's selecting operation.

The actual semantic information of the original language is determined by selecting among the vocabulary information items and the syntax information items on the template through man-machine dialogue. Directly selecting the vocabulary information items and the syntax information items actually carried by the natural language symbols on the all-information dialogue template by the user is the simplest manner of man-machine dialogue. Specifically, the determined items can be displayed in boldface, as shown in Figure 2.

The task of determining the natural language information can be accomplished by selecting among or confirming the vocabulary information items and syntax information items on the template, therefore, there is no need to analyze the semanteme of the sentence depending on the context.

It is far more difficult for a user to analyze and determine the abstract syntax relationship than to determine the polysemant information items. Therefore, in order to reduce the difficulty of the selecting of the information items about the part of speech, in practical operation, the information items about the part of speech arranged in a line may be converted into a spatial positioning arrangement as shown in Figure 5 to facilitate the selecting of the information items about the part of speech through man-machine dialogue. A syntax information dialogue frame is established by taking the modifying area, the nuclear area, and the supplementary area of the syntax information as the abscissa, and taking the subject area, the predicative area, and the object area as the ordinates, for the user to select the modifying object of "with a telescope".

During the practical man-machine dialogue, the method of partially displaying the template and the method of virtual template may also be adopted, such as the method of completely displaying the syntax information as shown in Figure 4a (items with "?" need the user's selection) and the method of displaying the dialogue behind the virtual template for "I see a boy with a telescope near the bank" as shown in Figure 4b. Those skilled in the art should appreciate that there may be a variety of methods of displaying the dialogue information during man-machine dialogue besides above examples.

Through commonly restricting the grammatical concepts and ordinary concepts and making man-machine complementary selection within the scope of restricted information items, the invention has obtained the necessary information for automatically converting into various languages. However, there will always be some syntax elements omitted by the user. Logically, as long as all the information items of existing languages symbols are determined, most of

the omitted parts can be automatically added by the user according to the context when reading the information (e.g. the omitted subject or object). However, in order to accurately communicate the semanteme, those sentence elements which can not be omitted should still be added through the all-information dialogue template, to ensure the quality of machine translation (e.g., if the subject and object have been selected from the candidate information items of a sentence, the relevant verb can not be omitted).

In order to clear up the ambiguity which may arise when the object language translation is created, the intermediate translation results which have undergone all-information dialogue are provided together with the translation to the user of the translation for his direct inquiry so as to completely clear up the newly arising ambiguity in object language. If the user would maintain the ambiguity intentionally, he may simultaneously select a variety of items during the selection.

Figure 6 illustrates the process of man-machine interactive information processing in the language translation method involving open all-information template man-machine dialogue, wherein the blocks 11-17 in the middle column show the main process of the computer of the translation system, the blocks 21-26 in the left column show the user's participation, and the blocks 31-35 in the right column show the relationship with the internal database and the rules library during the man-machine interaction. The unidirectional arrows indicate the direction of flow of man-machine interaction, and the bi-directional arrows indicate the referring to the rules and data during translation. "N" indicates that man-machine interaction is needed in the information processing, and "Y" indicates automatically entering into the next step in the process. "##---

--##" represents the information processing interface between the translation system and the Internet system, the upper side of which represents the side of the user of the original text and the lower side of which represents the side of the user of the translation.

At the beginning of the process, step 11 is performed, in which the user inputs the natural language symbols to be translated sequentially.

Referring to Figure 2, ten natural language symbols "I saw a boy with a telescope near the bank" are sequentially filled in ranks 1-10 of the template. In step 12 of the main program of the system, candidate vocabulary information items for the natural language symbols are searched in the expandable and multi-language corresponding vocabulary information item symbol library 31. When no item can be searched out, the user of the original text may describe the semanteme of the natural language symbol on the template using the semanteme symbols already included in the system. Above process leads to the creation of the candidate vocabulary information items including the items of definition of concepts, items of semantic attributes, items of tense, and items of voice. In case a blank information items of definition of concepts appears under a natural language symbol, e.g., a "?" appears below the symbol "bank", the user of the original text may describe its semanteme using vocabulay symbols for which information items have already been provided by the system, i.e., the item of definition of concept in the template, "institution for keeping or lending money". In step 13 of the main program of the system, according to the rules in the vocabulary information item probabilistic optimization rules library 32, the computer automatically optimizes among a variety of candidate vocabulary information items of the natural language symbols listed in the template, e.g., the

information items indicated in boldface in the template. In step 22, those semantic information items for which a definite optimization result is not obtained are subjected to the selection and confirmation by the user of the original text. In step 14 of the main program of the system, the syntax information items of the natural language symbols listed in the template are automatically marked by referring to the syntax information item automatic marking rules library 33, and above process leads to the creation of the items of part of speech, items of grammar attributes, and the items of case (upper position) in the template. In step 15 of the main program of the system, the syntax information items of natural language symbols are automatically optimized by referring to the syntax information item automatic optimization rules library 34, wherein the syntax information items for which the unique optimization result is not obtained may undergo the selection and confirmation of the user of the original text by referring to the syntax information item three dimension structure model library 23, e.g., the information items indicated in boldface in the template. Up to now, the main program of the system can communicate above determined information items in form of self-set codes over the network.

The template includes all the information items the natural language symbols can carry, the candidate information items include the definition of concept, the tense information, the voice information, the syntax information, the case (upper position) information, the information about the grammar attribute, the information about single or plural number and the information about feminine or masculine gender, moreover, the open template may be expanded in its lower part for other information which is manually marked.

When the user of the original user determines an original symbol through semanteme description in step 21 in Figure 6, the program of the system automatically counts the use frequency of the original symbol. When the use frequency achieves a certain level, new natural language symbols or new information items are simultaneously added in the natural language symbol library of various languages of the translation system. For example, when the use frequency of "bank" manually determined achieves a certain level, the system adds a new symbol "banque" in the natural language symbol library for French, describes its semanteme using corresponding French symbols which have already been included in the system, and provides other relevant candidate information items. The expanding methods for other languages are the same.

In step 16 of the main program of the system on the side of the user of the translation, the translation automatic conversion and generation rules library 35 is referred to, the information items determining results confirmed by the user of the original text are automatically converted into natural language translation required by the user of the translation. For example, the created result in Chinese in Fig. 7 "我在银行附近看见一男孩带望远镜". In step 17, the main program of the system will ask the user whether there is any ambiguity in the translation, if yes, the user of the translation may determine the scope of inquiry through man-machine interaction in step 26, wherein the user may refer to the multi-language information item symbol library 25. For example, in order to determine what "带望远镜" modifies, the subject or the object, as indicated by "?" in Figure 7, the user of the translation may directly inquiry about the syntax information items actually carried by the symbol and therefore will

determine that it modifies the object. Up to this point, the process of translation is completed.

The quality of communicating the semantic information is the radical obstacle for the machine translation to obtain broad international market in the era of network communication, therefore, man-machine dialogue is inevitable in order to effect substantial breakthrough. The translation scheme involving man-machine dialogue according to the invention may improve the quality of translation practically and of practical value. With the ability to accurately communicate the semantic information independently of the context, the convenient operation of the user, the ability to convert into a variety of object languages, the dialogue scheme being commonly used by various languages, and the simple and reliable technical measures, the invention is of great practical value in the field of network information communication and has broad international market in network on-line machine translation service.

According to the idea of above method, the invention also provides an all-information semanteme marking system which includes:

necessary semantic information library for storing therein basic vocabulary and definition of concepts thereof and syntax information items;

text input means for inputting a text whose semanteme is to be marked;

text storage means for storing the text inputted through the text input means;

text display means for displaying a text stored in the text storage means;

sentence selecting means for selecting a sentence in the text displayed by the text display means;

automatic sentence structure analyzing means for automatically analyzing the structure of the selected sentence based on statistical experience;

semanteme marking template display means for displaying a semanteme marking template, wherein: when a sentence is selected by the sentence selecting means, the semanteme marking template is displayed corresponding to the selected sentence, said template includes vocabulary information element items and syntax information element items corresponding to the words in the sentence, wherein the definition of concepts and all the synonyms of the words included in the necessary semantic information library are displayed in the corresponding vocabulary information element items, all the possible syntax information items of the vocabulary are displayed in the syntax information element items based on the analysis results of the automatic sentence structure analyzing means, wherein the syntax information items are also stored in the necessary semantic information library;

semanteme marking means adapted for the user to select one or more items from the definition of concepts and the synonyms in the vocabulary information element items and one or more items from the syntax information items in the syntax information element items;

marked text storage means for storing the text with the marking information;

marking instructing means for instructing the system to display the marking information of a sentence in the text displayed by the text display means; and

marking display means for displaying in the form of said marking template the marking information corresponding to the instructed sentence which is stored in the marked text storage means.

One application of the all-information semanteme marking system is all-information semanteme marking system involving one language. For example, there are a variety of branches of law and there is need for establishing corresponding knowledge library. To develop expert system is of great practical value. An common need is to help the ordinary user comprehend and identify the articles of law. All the existing expert systems are question-and-answer man-machine interface: the system raises a lot of questions sequentially, the user answers with "Yes" or "No" or inputting simple data one by one, then the system searches in the knowledge library and draws a conclusion based on the matching between the question and the knowledge, and then provide the conclusion to the user.

Such "question-and-answer" man-machine interface is too awkward and tedious. In addition, the questions are prescribed in advance and inflexible. Such a system appears stupid.

If the semanteme marking technology involving one language is employed to input the all-information data of the language symbols at one time when inputting the articles of law annotation, contract, agreement, or indictment, the user's inquiry and classification will be greatly facilitated.

The semanteme marking technology involving one language is not only adapted to establish various expert systems, but also of great practical value in improving the accuracy of semanteme of the law annotation, the contents of the contract, and the technical description documents.

The semanteme marking technology involving one language can be realized simply by adopting the technology of processing the original language

employed in the all-information translation template and by providing specialized vocabulary library.

Another application of the all-information semanteme marking system is all-information foreign language teaching system.

Computer-aided teaching is widely used nowadays. In the field of foreign language teaching, it mainly appears as multimedia teaching method (listening, speaking, reading and writing) and teaching method of exercise library, while the all-information language template provides a computer-aided teaching method for foreign language teaching which can systematically reflect the generality of the concepts and the individual character of the symbols of various languages.

When the user inputs a sentence of his native language:

if the user selects the definition of concept of a word of his native language, the all-information template may retrieve all the corresponding words of various languages;

if the user selects the information items about the tense, voice and part of speech, the all-information teaching system may provide in steps the process of symbol transforming and sequence converting based on the interacting technology and internal converting rules of the all-information system; and

if the user inputs a sentence of foreign language directly, the all-information template may not only provide all-information semanteme marking of foreign language but also convert the all-information semanteme marking information into the his native language through the unified codes of various languages provided by the system.